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United States
Department of
Agriculture

Forest
Service

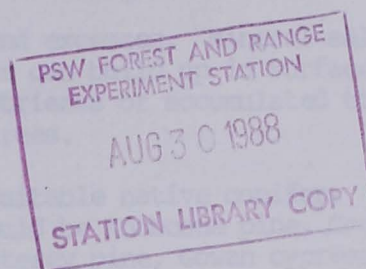
Pacific
Southwest
Region

Regional Office
630 Sansome Street
San Francisco, CA 94111

Reply To: 3420/6280

Date: AUG 02 1988

R.E. Burgoyne
LCDR, CEC, USN
Public Works Officer
Department of The Navy
Naval Postgraduate School
Monterey, CA 93943-5000



RE: Declining Coastal Redwood Trees at the
Naval Postgraduate School in Monterey
(Report No. 88-17)

Dear Mr. Burgoyne:

At the request of R.E. Burgoyne, James Allison, Plant Pathologist and Bruce Roettgering, Entomology Group Leader, examined declining coastal redwood trees on the Naval Postgraduate School grounds in Monterey. They were accompanied by Harry Hanano, gardener at the Naval Postgraduate School.

The individual trees were exhibiting tip and twig dieback from the outside in and from the tops to bottoms of the trees. Some of the affected trees were about 100 years old. Visual and microscopic examination, as well as laboratory isolations from needles and branches, sent to our office did not reveal any pathogenic organisms. Field observations of needles and branches from selected declining trees did not show the presence of any pathogens.

We observed that a number of declining trees have Ivy growing under them. In years of normal precipitation the ivy might be justified on the basis of aesthetics but, in dry years the high water requirement of Ivy causes the tree roots to have a water deficit. We examined trees watered with non-potable water (irregular watering schedule) and found that those trees exhibited more dieback and decline than those irrigated with potable water. Trees with a mulch covering over the root zone did not exhibit dieback.

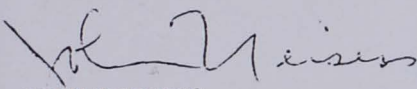
Examination of the declining redwood trees has led us to conclude that the decline is due to a lack of sufficient water. In addition to the lack of precipitation over the past few years, the trees are growing off-site. Redwoods require a wet environment with summer fog and dew. The declining trees we observed were in an area where the precipitation is less than 20 inches a year.



In order to reduce the impact of the dry weather on your redwoods, consider the following actions:

1. Irrigate and fertilize all redwoods on a regular basis.
2. Remove all ground cover such as Ivy from tree root zones and apply mulch if possible.
3. Have non-potable water from lake tested now and in fall for total salts, heavy metals, borates, sodium, and chloride, because the lake is filled by run off from many sources.
4. Have soils tested for mineral deficiencies and excesses. Mineral salts present in low concentrations in irrigation water can build up in surface soil and either reduce the availability of mineral nutrients or accumulated to toxic levels causing dieback and decline of affected trees.
5. Replace the redwood trees as they die with suitable native conifers adaptable to areas of low rainfall. Examples would be Knobcone pine, Coulter pine, Torrey pine, bishop pine, Digger pine, Monterey pine, Gowan cypress, or giant sequoia.

If you need additional input on this subject, please contact James Allison or Bruce Roettgering directly at (415) 556-6520.



JOHN NEISESS
FPM/ Program Leader
State and Private Forestry